

## **IN THE CLAIMS:**

Please amend claims 1-3, 6-17, 20-23, 26-37, and 40, as follows.

1. (Currently Amended) A method for communicating multicast group membership information in a network between a plurality of routers in a multicast group, the method comprising:

reporting routing tree information from~~wherein~~ each of the plurality of routers reports ~~routing tree information~~ to other routers of said plurality of routers, wherein the routing tree information comprises a source tree for a unicast routing protocol;~~said method comprising the steps of;~~

receiving update information at a second router in the network from a first router, said update information ~~transmit from a first router and including~~ comprising update information on a multicast group and a network address of said first router; ~~said update information indicating~~

using said update information to indicate that said first router is becoming a member of said multicast group;~~and a network address of said first router;~~

determining, based at least in part on said update information and the routing tree information reported by said first router, whether said second router ~~must transmit~~ is to transmit said update information; so that all members of said multicast group remain connected, by determining if said source tree reported by said first router has said second router as ~~the~~ a root of a subtree from which said first router is excluded, and if at least one

neighbor router of said second router in said subtree is not a member of said multicast group; and

in response to a positive determination, transmitting said update information from said second router to said at least one neighbor router of said second router.

2. (Currently Amended) The method of claim 1, ~~wherein~~ further comprising:  
configuring said update information ~~includes to comprise~~ an identifier of said multicast group.

3. (Currently Amended) The method of claim 1, ~~wherein~~ further comprising:  
configuring said update information ~~includes to comprise~~ a network address of said first router.

4.-5. Cancelled

6. (Currently Amended) The method of claim 1, wherein said ~~step of~~  
determining further comprises determining if said first router is not a member of said multicast group.

7. (Currently Amended) The method of claim 6, ~~wherein~~ further comprising:

configuring said update information includes to comprise a time stamp, and  
wherein said ~~step of~~ determining further comprises determining if said time stamp is valid.

8. (Currently Amended) The method of claim 7, ~~wherein further comprising:~~  
configuring said time stamp comprises to comprise a first time stamp and wherein  
said ~~step of~~ determining if said time stamp is valid comprises determining if said first time stamp is more recent than a second time stamp stored in said second router, wherein said second time stamp is associated with said multicast group and said first router.

9. (Currently Amended) The, method of claim 1, ~~wherein further comprising:~~  
configuring said update information includes to comprise an indication that said  
first router is no longer a member of said multicast group.

10. (Currently Amended) The method of claim 9, ~~wherein further comprising:~~  
configuring the routing tree information comprises to comprise a source tree for a  
unicast routing protocol, ~~and wherein said step of~~ determining comprises determining if said source tree reported by said first router has said second router as the root of said subtree from which said first router is excluded, and if at least one neighbor router of said second router in said subtree is a member of said multicast group.

11. (Currently Amended) The method of claim 10, wherein said ~~step of~~ determining further comprises determining if said first router is not a member of said multicast group.

12. (Currently Amended) The method of claim 11, ~~wherein~~ further comprising:  
configuring said update information includes to comprise a time stamp, and wherein said ~~step of~~ determining further comprises determining if said time stamp is valid.

13. (Currently Amended) The method of claim 12, ~~wherein~~ further comprising:  
configuring said time stamp comprises to comprise a first time stamp, and wherein said ~~step of~~ determining if said time stamp is valid comprises determining if said first time stamp is more recent than a second time stamp stored in said second router, wherein said second time stamp is associated with said multicast group and said first router.

14. (Currently Amended) A method for forwarding multicast packets, in a network comprising a plurality of routers in a multicast group, the method comprising:  
wherein reporting routing tree information from each of the plurality of routers  
~~reports routing tree information to other routers of said plurality of routers, said method comprising the steps of:~~

receiving a multicast packet at a second router from a first router, said multicast packet ~~transmit from a first router and including~~ comprising control information, wherein a multicast packet is from a selected source and for a selected multicast group;

determining, based at least in part on said control information and the routing tree information reported by said first router, if said multicast packet is to be forwarded by said second router; and

in response to a positive determination that said multicast packet is to be forwarded, ~~in said step of determining:~~

forwarding said multicast packet from said second router to at least a third router, and

creating an entry in a multicast forwarding cache, wherein said entry ~~indicating~~ indicates that a multicast packet from said selected source and said selected multicast group ~~should~~ is to be forwarded from said second router, ~~wherein and~~

maintaining by said second router ~~maintains~~ a multicast packet-forwarding cache, and wherein said multicast packet-forwarding cache ~~includes~~ comprises an entry indicating each multicast packet recently forwarded by said second router.

15. (Currently Amended) The method of claim, 14, ~~wherein—further~~ comprising:

configuring said multicast packet ~~includes to comprise~~ an address of the multicast group.

16. (Currently Amended) The method of claim 14, further comprising: wherein configuring said multicast packet includes to comprise an address of the source of said multicast packet.

17. (Currently Amended) The method of claim 14, further comprising: wherein configuring said multicast packet includes to comprise a time value, wherein said time value is used to limit the time said multicast packet is allowed to remain in the network.

18-19. Cancelled

20. (Currently Amended) A method for forwarding multicast packets in a network comprising a plurality of routers in a multicast group, the method comprising: reporting routing tree information wherein from each of the plurality of routers ~~reports routing tree information to other routers of said plurality of routers; said method comprising the steps of;~~

receiving a multicast packet at a second router from a first router, said multicast packet ~~transmit from a first router and including~~comprising control information, wherein a multicast packet is from a selected source and for a selected multicast group;

determining, based at least in part on said control information and the routing tree information reported by said first router, if said multicast packet is to be forwarded by said second router; and

in response to a positive determination that said multicast packet is to be forwarded, ~~in said step of determining:~~

forwarding said multicast packet from said second router to at least a third router, and

creating an entry in a multicast forwarding cache, wherein said entry ~~indicating~~ indicates that a multicast packet from said selected source and said selected multicast group ~~should~~ is to be forwarded from said second router, ~~wherein and~~

configuring the routing tree information reported by said first router ~~comprises to comprise~~ a source tree for a unicast routing protocol, and

wherein said ~~step of determining~~ comprises determining if said first router is ~~the a~~ next hop in ~~the a~~ shortest path from said second router to the source of the multicast packet according to said source tree, and if said source tree has said second router in a subtree with at least one router in said subtree being a member of the multicast group.

21. (Currently Amended) An apparatus ~~for communicating multicast group membership information in a network between a plurality of routers in a multicast group,~~ comprising:

a plurality of routers in a multicast group configured to communicate multicast group membership information in a network to other routers of said plurality of routers, wherein each of the plurality of routers reports routing tree information to other routers of said plurality of routers, wherein the routing tree information comprises a source tree for a unicast routing protocol, ~~said apparatus comprising:~~

a first router; and

a second router,

wherein said first router ~~for receiving~~ is configured to receive update information ~~transmit~~ transmitted from a said second router and ~~including~~ comprises update information on a multicast group and an indication that said second router is becoming a member of said multicast group,

wherein said first router ~~determines~~ is configured to determine, based at least in part on said update information and the routing tree information reported by said second router, whether said first router ~~must~~ is to transmit said update information to at least one neighbor router of said first router, by determining if said source tree reported by said, second router has said first router as ~~the~~ a root of a subtree from which said second router is excluded, and at least one neighbor router of said first router in said subtree is not a member of said multicast group, so that all members of said multicast group remain connected, and



wherein said first router, in response to a positive determination that said first router ~~must~~is to transmit said update information, ~~transmits~~is configured to transmit said update information to said at least one neighbor router.

22. (Currently Amended) The apparatus of claim 21, wherein said update information ~~includes~~comprises an identifier of said multicast group.

23. (Currently Amended) The apparatus of claim 21, wherein said update information ~~includes~~comprises a network address of said first router.

24.-25. Cancelled

26. (Currently Amended) The apparatus of claim 23, wherein said first router is further configured to ~~determines~~determine whether said first router ~~must~~is to transmit said update information by determining if said second router is not a member of said multicast group.

27. (Currently Amended) The apparatus of claim 26, wherein said update information ~~includes~~comprises a time stamp, and wherein said first router further determines whether said first router ~~must~~is to transmit said update information by determining if said time stamp is valid.

28. (Currently Amended) The apparatus of claim 27, wherein said first router ~~further stores~~ is further configured to store a time stamp associated with said multicast group and said second router, wherein said time stamp comprises a first time stamp and wherein said first router ~~determines~~ is configured to determine whether said time stamp is valid by determining if said first time stamp is more recent than said second time stamp.

29. (Currently Amended) The apparatus of claim 21, wherein said update information ~~includes~~ comprises an indication that said second router is no longer a member of said multicast group.

30. (Currently Amended) The apparatus of claim 29, wherein the routing tree information comprises a source tree for a unicast routing protocol, and wherein said first router ~~determines~~ is configured to determine whether said first router ~~must~~ is to transmit said update information by determining if said source tree reported by said second router has said first router as the root of a subtree from which said second router is excluded, and at least one neighbor router of said first router in said subtree is a member of said multicast group.

31. (Currently Amended) The apparatus of claim 30, wherein said first router ~~further determines~~ is further configured to determine whether said first router must

transmit said update information by determining if said second router is not a member of said multicast group.

32. (Currently Amended) The apparatus of claim 31, wherein said update information ~~includes~~comprises a time stamp, and wherein said first router further determines whether said first router must transmit said update information by determining if said time stamp is valid.

33. (Currently Amended) The apparatus of claim 32, wherein said first router ~~further stores~~is further configured to store a time stamp associated with said multicast group and said second router, wherein said time stamp comprises a first time stamp and wherein said first router ~~determines~~is configured to determine whether said time stamp is valid by determining if said first time stamp is more recent than said second time stamp.

34. (Currently Amended) An apparatus, comprising:  
a plurality of routers in a multicast group configured to forward~~for forwarding~~  
multicast packets in a network ~~comprising a plurality of routers in a multicast group,~~  
wherein each of the plurality of routers reports control information including routing tree information to other routers of said plurality of routers, ~~said apparatus comprising:~~

a first router;

a second router; and

~~a third router~~~~a first router~~, ~~said~~ wherein said first router including comprises a  
multicast forwarding cache, ~~said first router, further for receiving and is configured to~~  
receive a multicast packet from a said second router in a said network, wherein said  
multicast packet is from a selected source and for a selected multicast group,

wherein said first router is configured to determinedetermining, based at least in  
part, on said control information and the routing tree information reported by said second  
router to said first router, if said multicast packet is to be forwarded by said first router,  
and

wherein said first router, in response to a positive determination that said multicast  
packet is to be forwarded, ~~forwards~~ is configured to forward said multicast packet to at  
least a said third router, and

wherein said first router ~~creates and~~ is configured to create an entry indicating that  
a multicast packet from said selected source and said selected multicast group ~~should are~~  
to be forwarded after making a positive determination that said multicast packet is to be  
forwarded,

wherein said first router comprises a multicast packet-forwarding cache, and

wherein said multicast packets forwarding cache ~~includes~~ comprises an entry,  
indicating each multicast packet, recently forwarded by said first router.

35. (Currently Amended) The apparatus of claim 34, wherein said multicast  
packet ~~includes~~ comprises an address of the multicast group.

36. (Currently Amended) The apparatus of claim 34, wherein said multicast packet ~~includes~~comprises an address of the source of said multicast packet.

37. (Currently Amended) The apparatus of claim, 34, wherein said multicast packet ~~includes~~comprises a time value, wherein said time value is used to limit the time said multicast packet is allowed to remain in the system.

38-39. Cancelled

40. (Currently Amended) An apparatus, comprising:  
a plurality of routers in a multicast group configured to forward~~for forwarding~~  
multicast packets in a network ~~comprising a plurality of routers in a multicast group,~~  
wherein each of the plurality of routers reports control information including routing tree  
information to other routers of said plurality of routers, ~~said apparatus comprising:~~

a first router;

a second router; and

a third router, said wherein said first router including comprises a multicast  
forwarding cache, ~~said first router, further for receiving and is configured to receive~~ a  
multicast packet from a said second router in a said network, wherein said multicast  
packet is from a selected source and for a selected multicast group,

wherein said first router is configured to determine~~determining~~, based at least in part, on said control information and the routing tree information reported by said second router to said first router, if said multicast packet is to be forwarded by said first router, and

wherein said first router, in response to a positive determination that said multicast packet is to be forwarded, ~~forwards~~ is configured to forward said multicast packet to at least a ~~said~~ third router, and

wherein said first router ~~creates and~~ is configured to create an entry indicating that a multicast packet from said selected source and said selected multicast group ~~should be~~ are to be forwarded after making a positive determination that said multicast packet is to be forwarded,

wherein the routing tree information reported by said second router comprises a source tree for a unicast routing protocol, and

wherein ~~said step of determining comprises~~ said first router is further configured to determine ~~determining~~ if said second router is ~~the~~ a next hop in ~~the~~ a shortest path from said first router to the source of the multicast packet according to said source tree, and if said source tree has said first router in a subtree with at least one router in said subtree being a member of the multicast group.